

FILE 'BIOSIS, MEDLINE, EMBASE, EMBAL, BIOTECHDS, CAPLUS' ENTERED  
AT

12:45:39 ON 09 JUL 2001

L1 191 S **GLUTAMYL AND RNA AND REDUCTASE**  
L2 0 S L1 AND ((T)RNA) OR T-RNA)  
L3 128 DUP REM L1 (63 DUPLICATES REMOVED)  
L4 2 S L3 AND **SOYBEAN?**  
L5 0 S L3 AND **MAIZE**  
L6 3223 S **TETRACYCLEDROLE?**  
L7 40 S L6 AND (**SOYBEAN? OR MAIZE?**)  
L8 3 S L7 AND (**REDUCTASE?**)  
L9 1 DUP REM L8 (2 DUPLICATES REMOVED)

L4 ANSWER 1 OF 2 BIOSIS COPYRIGHT 2001 BIOSIS

ACCESSION NUMBER: 1999:236444 BIOSIS

DOCUMENT NUMBER: PREV199900236444

TITLE: Expression of a **soybean** gene encoding the  
**tetrapyrrole**-synthesis enzyme **glutamyl -tRNA**  
**reductase** in symbiotic root nodules.

AUTHOR(S): Sangwan, Indu; O'Brian, Mark R. (1)

CORPORATE SOURCE: (1) Department of Biochemistry, State University of New  
York, Buffalo, NY, 14214 USA

SOURCE: Plant Physiology (Rockville), (Feb., 1999) Vol. 119, No. 2,  
pp. 593-598.

ISSN: 0032-0889.

DOCUMENT TYPE: Article

LANGUAGE: English

SUMMARY LANGUAGE: English

AB Heme and chlorophyll accumulate to high levels in legume root nodules and  
in photosynthetic tissues, respectively, and they are both derived from  
the universal **tetrapyrrole** precursor delta-aminolevulinic acid (ALA). The  
first committed step in ALA and **tetrapyrrole** synthesis is catalyzed by  
**glutamyl -tRNA reductase** (GTR) in plants. A  
**soybean** (Glycine max) root-nodule cDNA encoding GTR was isolated  
by complementation of an Escherichia coli GTR-defective mutant for  
restoration of ALA prototrophy. Gtr mRNA was very low in uninfected roots  
but accumulated to high levels in root nodules. The induction of Gtr mRNA  
in developing nodules was subsequent to that of the gene Enod2 (early  
nodule) and coincided with leghemoglobin mRNA accumulation. Genomic  
analysis revealed two Gtr genes, Gtr1 and a 3' portion of Gtr2, which were  
isolated from the **soybean** genome. **Rnase**-protection analysis  
using probes specific to Gtr1 and Gtr2 showed that both genes were  
expressed, but Gtr1 mRNA accumulated to significantly higher levels. In  
addition, the qualitative patterns of expression of Gtr1 and Gtr2 were  
similar to each other and to total Gtr mRNA in leaves and nodules of

mature plants and etiolated plantlets. The data indicate that Gtr1 is universal for **tetrapyrrole** synthesis and that a Gtr gene specific for a tissue or **tetrapyrrole** is unlikely. We suggest that ALA synthesis in specialized root nodules involves an altered spatial expression of genes that are otherwise induced strongly only in photosynthetic tissues of uninfected plants.

L4 ANSWER 2 OF 2 CAPLUS COPYRIGHT 2001 ACS

ACCESSION NUMBER: 2001:101292 CAPLUS

DOCUMENT NUMBER: 134:158499

TITLE: Protein and cDNA sequences of plant aminolevulinic acid biosynthetic enzymes homologs

INVENTOR(S): Cahoon, Rebecca E.; Gutteridge, Steven; Harvell, Leslie T.; Rafalski, J. Antoni; Tao, Yong; Weng, Zude

PATENT ASSIGNEE(S): E.I. Du Pont De Nemours and Company, USA

SOURCE: PCT Int. Appl., 77 pp.

CODEN: PIXXD2

DOCUMENT TYPE: Patent

LANGUAGE: English

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 2001009304	A2	20010208	WO 2000-US21008	20000728
W: AE, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CR, CU, CZ, DE, DK, DM, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, US, UZ, VN, YU, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM RW: GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW, AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG				

PRIORITY APPLN. INFO.: US 1999-146600 P 19990730

AB This invention provides protein and cDNA sequence homologs of aminolevulinic acid biosynthetic enzymes, which are selected from cDNA libraries of **soybean**, rice, corn and wheat. The invention also relates to the construction of a chimeric gene encoding all or a portion of the phospholipid biosynthetic enzyme, in sense or antisense orientation, wherein expression of the chimeric gene results in prodn. of altered levels of the phospholipid biosynthetic enzyme in a transformed host cell.

L9 ANSWER 1 OF 1 BIOSIS COPYRIGHT 2001 BIOSIS DUPLICATE 1

ACCESSION NUMBER: 1999:236444 BIOSIS

DOCUMENT NUMBER: PREV199900236444

TITLE: Expression of a **soybean** gene encoding the **tetrapyrrole** -synthesis enzyme **glutamyl-tRNA reductase** in symbiotic root nodules.

AUTHOR(S): Sangwan, Indu; O'Brian, Mark R. (1)

CORPORATE SOURCE: (1) Department of Biochemistry, State University of New York, Buffalo, NY, 14214 USA

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Rnase-protection analysis using probes specific to Gtr1 and Gtr2 showed that both genes were expressed, but Gtr1 mRNA accumulated to significantly higher levels. In addition, the qualitative patterns of expression of Gtr1 and Gtr2 were similar to each other and to total Gtr mRNA in leaves and nodules of mature plants and etiolated plantlets. The data indicate that Gtr1 is universal for **tetrapyrrole** synthesis and that a Gtr gene specific for a tissue or **tetrapyrrole** is unlikely. We suggest that ALA synthesis in specialized root nodules involves an altered spatial expression of genes that are otherwise induced strongly only in photosynthetic tissues of uninfected plants.

TI Expression of a **soybean** gene encoding the **tetrapyrrole** -synthesis enzyme **glutamyl-tRNA reductase** in symbiotic root nodules.

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restoration of ALA. . . mRNA accumulation. Genomic analysis revealed two Gtr genes, Gtr1 and a 3' portion of Gtr2, which were isolated from the soybean genome. RNase-protection analysis using probes specific to Gtr1 and Gtr2 showed that both genes were expressed, but Gtr1 mRNA accumulated. . . Gtr mRNA in leaves and nodules of mature plants and etiolated plantlets. The data indicate that Gtr1 is universal for tetrapyrrole synthesis and that a Gtr gene specific for a tissue or tetrapyrrole is unlikely. We suggest that ALA synthesis in specialized root nodules involves an altered spatial expression of genes that are. . .

- IT . . .  
Molecular Biophysics)
- IT Parts, Structures, & Systems of Organisms  
root nodule
- IT Chemicals & Biochemicals  
chlorophyll; gamma-aminolevulinic acid; glutamyl-transfer RNA reductase ; heme; leghemoglobin messenger RNA; tetrapyrrole : biosynthesis; Gtr Messenger RNA; Gtr1 messenger RNA; Glycine max Enod2 gene [early nodule 2 gene] (Leguminosae); Glycine max Gtr1 gene (Leguminosae): expression, glutamyl-transfer RNA reductase gene family; Glycine max Gtr2 gene (Leguminosae): expression, glutamyl-transfer RNA reductase gene family
- ORGN Super Taxa  
Leguminosae: Dicotyledones, Angiospermae, Spermatophyta, Plantae
- ORGN Organism Name  
Glycine max [ soybean ] (Leguminosae): host
- ORGN Organism Superterms  
Angiosperms; Dicots; Plants; Spermatophytes; Vascular Plants
- RN 119940-26-0 (GLUTAMYL-TRNA REDUCTASE )  
9037-80-3 ( REDUCTASE )  
14875-96-8 (HEME)